

CLAIMS

1. Method of treating water for purification and / or drinkability, of the type comprising at least one step bringing the said water into contact with at least one inorganic powder reagent with high specific surface area, for reducing the content of organic matter in the said water, and at least one membrane separation step, characterised in that it comprises a step for treating the blow-off products (32) derived from the said membrane separation step to separate the said blow-off products into at least two fractions:

- a first fraction containing the major part of the powder reagent (in other words more than 60% by mass) in a low water flow rate, in other words less than 40% of the blow-off flow rate, preferably 20% of the blow-off flow rate, that contains organic matter and micro pollutants;

- a second fraction containing the major part of organic matter not adsorbed on the reagent rejected by the membranes and concentrated in the blow-off products, in a larger water flow rate, preferably 4 to 20 times more than the low flow rate mentioned above, the said first fraction (321) being reinjected into the said water on the upstream side of the said step consisting of bringing the said water into contact with the said powder reagent.

2. Water treatment method according to claim 1, characterised in that the said powder reagent is Powdered Activated Carbon (PAC).

3. Method according to either claim 1 or 2, characterised in that it includes a gravity separation step that takes place before the step in which the water is brought into contact with the powder reagent.

5 4. Method according to claim 3, characterised in that the said gravity separation step is preceded by a flocculation or coagulation - flocculation step.

5. Method according to any one of claims 1 to 4, characterised in that the said powder reagent is used
10 as a support for a nitrifying biomass, and air is injected during the step in which water is brought into contact with the powder reagent.

6. Water treatment method according to any one of claims 1 to 5, characterised in that said treatment
15 step of the said blow-off products comprises a hydraulic separation step.

7. Water treatment method according to claim 6, characterised in that the said separation step is done using at least one hydrocyclone (5).

20 8. Water treatment method according to any one of claims 1 to 7, characterised in that the said blow-off products (32) derived from the said membrane separation are collected continuously.

9. Water treatment method according to any one of
25 claims 1 to 7, characterised in that the said blow-off products (32) derived from the said membrane separation are collected periodically.

10. Water treatment method according to claim 9, characterised in that the interval at which the said
30 blow-off products (32) are collected depends on the concentration of powder reagent in the said water

present in the said step in which the said water is brought into contact with the said powder reagent.

11. Water treatment method according to any one of claims 1 to 10, characterised in that it comprises at least one step for extraction of the said used powder reagent.

12. Water treatment method according to claim 11, characterised in that the said extraction step is done on the upstream side of the said separation step of the said blow-off products (32).

13. Water treatment method according to any one of claims 1 to 12, characterised in that the said membrane separation step is done using pressurised membranes.

14. Water treatment method according to any one of claims 1 to 13, characterised in that the said membrane separation step is performed using immersed membranes (31).

15. Water treatment method according to any one of claims 1 to 14, characterised in that the said second fraction (322) is evacuated.

16. Water treatment method according to any one of claims 1 to 15, characterised in that the said second fraction (322) is reinjected into the said water to be treated, on the upstream side of the said gravity separation step.

17. Installation for use of a process according to any one of claims 1 to 16, of the type comprising at least one tank (2) in which the said water is brought into contact with an inorganic powder reagent with high specific surface area and at least one membrane separation unit (3), characterised in that it comprises

at least one hydraulic separation unit (5) for blow-off products derived from the said membrane separation unit (3), the said hydraulic separation unit (5) separating the said blow-off products into at least two fractions:

5 - a first fraction (321) containing the major part of the powder reagent (in other words more than 60% by mass) in a low water flow rate (in other words less than 40% of the blow-off flow rate, preferably 20% of the blow-off flow rate) that contains organic matter
10 and micro pollutants;

 - a second fraction (322) containing the major part of organic matter not adsorbed on the reagent rejected by the membranes and concentrated in the blow-off products, in a larger water flow rate, preferably 4
15 to 20 times more than the low flow rate mentioned above,

 and in that it comprises means (61) of conveyance of the said first fraction to the said contact tank (2).

20 18. Installation according to claim 17, characterised in that it comprises a gravity separation unit installed on the upstream side of the said contact tank (2).

 19. Installation according to claim 18,
25 characterised in that it is provided with coagulation and / or flocculation means on the upstream side of the said gravity separation unit.

 20. Installation according to any one of claims 17 to 19, characterised in that it comprises air injection
30 means 7 to maintain the powder reagent in suspension, the oxygen supply necessary for a biological treatment

and possibly for unblocking membranes if they are immersed in the said contact tank (2).

21. Installation according to any one of claims 17 to 20, characterised in that the said hydraulic separation unit (5) comprises at least a hydrocyclone.

22. Installation according to any one of claims 17 to 21, characterised in that the said membrane separation unit (3) comprises at least one filtration tank integrating at least one immersed membrane.

23. Installation according to any one of claims 17 to 21, characterised in that the said membrane separation unit comprises at least one filtration tank integrating at least one pressurised membrane.

24. Installation according to any one of claims 17 to 23, characterised in that it comprises a tank (6) for storage of the said blow-off products derived from the said membrane separation unit (3).

25. Installation according to any one of claims 17 to 24, characterised in that it comprises means of extracting the said used powder reagent.

26. Installation according to any one of claims 17 to 25, characterised in that the said extraction means are provided on the said conveyance means (61) and / or the said contact tank (2).

27. Installation according to any one of claims 17 to 26, characterised in that it comprises means for evacuating the said second fraction (322).

28. Installation according to any one of claims 17 to 27, characterised in that it comprises means of conveyance of the said second fraction (322) to the said gravity separation unit (1).